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Original Article

Incidence of physical inactivity and excessive screen time during the first wave of the COVID-19 pandemic in Brazil: what are the most affected population groups?

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ABSTRACT

Purpose: Our aim was to verify the incidence of physical inactivity and excessive screen time during the first wave of the COVID-19 pandemic among Brazilian adults, as well as to identify subgroups that are more affected by the quarantine actions.

Methods: The data of 39,693 Brazilian adults were collected through an online questionnaire between April 24th and May 24th, 2020. Information about physical activity (weekly frequency and daily duration), TV viewing, and computer/tablet use (daily duration) before and during the pandemic period were reported. The correlates adopted were sex, age group, highest academic achievement, skin color, per capita income, country macro region, working status during the quarantine, and adherence to the quarantine. Logistic regression models were used.

Results: The incidence of physical inactivity (<150 min/week), high TV viewing (≥4 h/d), and computer/tablet use (≥4 h/d), were, respectively, 70.4%, 31.4%, and 37.9% during the COVID-19 pandemic. The younger age group showed higher incidences of physical inactivity (78%) and high computer/tablet use (59%), while middle-age adults (30–59 years) showed a higher incidence of TV viewing (34%). People who adhered to stricter measures of quarantine presented a higher incidence of excessive screen time.

Conclusion: High incidences of physical inactivity and excessive screen time were identified in specific population subgroups during the first wave of the COVID-19 pandemic in Brazil.

Introduction

The new coronavirus (COVID-19) pandemic has changed the life of humans around the world [1,2]. Given the need for social distancing to limit the spread of the virus, it is recommended that people stay at home, reducing their opportunities to practice physical activity outside the home and increasing sedentary behavior [3,4].

The recent World Health Organization guidelines on physical activity suggest that adults should perform 150–300 min/week of moderate intensity or 75–150 min/week of vigorous physical activity (as well as a combination of the two) for general health benefits [5]. In addition, these new guidelines provide recommendations on reducing sedentary behavior (sitting/reclining/lying activities with low energy expenditure [6]), which has been highlighted as a predictor of adverse health outcomes, regardless of meeting physical activity guidelines [7]. Therefore, an adequate balance between these movement behaviors is associated with positive mental [8] and physical health [9], including the immune system [10–12].

Conflicts of Interest: Authors declare no conflicts of interest.

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Given the difficulty in staying active during quarantine periods and the potentially negative effect of unhealthy behaviors during the pandemic, studies are warranted to identify how lifestyle behaviors of the population have changed due to the COVID-19 quarantine [13]. In addition, the identification of more affected population subgroups could lead to interventions to mitigate the harmful effects of the pandemic.

Thus, our aim was to verify the impact of the first wave of the COVID-19 pandemic on physical activity and screen time behaviors among Brazilian adults, as well as to identify subgroups that are more affected by the quarantine actions. We hypothesized that all population subgroups would present changes in behavior during the pandemic, but that subgroups with greater adherence to the quarantine measures and those with good habits before the pandemic would be more affected.

Methods

Design and sample

The "Brazilian behavioral research during the COVID-19 pandemic" was a health survey using a virtual questionnaire to assess the changes that have occurred in the lives of Brazilians since the arrival of the first wave of the coronavirus pandemic in the country, related to social restriction initiatives for the protection of people, including quarantine. Data collection was conducted between April 24th and May 24th, 2020.

To attenuate selection bias, the participants were invited through a chain sampling procedure. In the first stage, the 15 researchers involved in the study chose a total of 200 other researchers from different states in Brazil. In addition, each researcher in the study chose 20 people from their social network, making a total of 500 people chosen. The people chosen in the first stage were denominated influencers and were asked to send the survey link to at least 12 people from their social networks, obeying a stratification by sex, age range (18–39; 40–59; 60+), and education level (none or elementary school, high school, and more than high school). That is, six women and six men, two in each age group, one from each education level. People invited by the influencers were encouraged to invite at least three more people from their social networks, representing the second wave of invitations). In addition, information about the study was disseminated through press releases, social communications from participating research institutions, state health departments, and social media. The survey link was also available at the influencers' research institutions. Further details about the study procedures are available elsewhere [14]. All procedures were approved by the National Research Ethics Commission (CONEP) (process: 30598320.1.0000.5241). From the initial sample (n = 45,160), 5467 presented missing data in at least one variable and were excluded from the present analyses. The final sample was composed of 39,693 participants. The sample was weighted according to characteristics from the National Household Sample Survey (conducted annually), considering the population in each state, education, age, sex, and prevalence of chronic diseases, to include a nationally representative sample.

Physical activity

For physical activity before the COVID-19 pandemic, participants were asked *"Before the COVID-19 pandemic, how many days a week did you practice any type of physical exercise or sport? (do not consider physical therapy)."* Possible answers were: a) less than 1; b) 1–2; c) 3–4; or d) 5 or more. For those reporting physical activity practice, we also asked: *"How long did this activity last?"*. Possible answers were: a) less than 30 min; b) 30–45 min; c) 46–60 min; or d) more than 60 min. In addition, for physical activity during the COVID-19 pandemic, the participants were asked: "*During the COVID-19 pandemic how many days a week did you practice any type of physical exercise or sport? (do not consider physical therapy).*" Possible answers were: a) less than 1; b) 1–2; c) 3–4; or d) 5 or more. For those reporting physical activity practice, we also asked: *"How long did this activity last?"*. Possible answers were: a) less than 30 min; b) 30–45 min; c) 46–60 min; or d) more than 60 min. The final indicator of physical activity was estimated based on the midpoint of each category. In this sense, the frequency: (less than 1 = midpoint 0.5; 1–2 days = midpoint 1.5; 3–4 days = midpoint 3.5; 5 or more days = midpoint 6) was multiplied by the duration of the activity (less than 30 min = midpoint 15; b) 30–45 min = midpoint 37.5; c) 46–60 min = midpoint 52.5; or d) more than 60 min = midpoint 60). Physical inactivity was classified as less than 150 min/week of physical activity [5].

Screen time

TV viewing and computer/tablet use were adopted as independent proxies of screen time. For TV viewing, participants were asked: *"Usually, before the pandemic, how many hours a day did you use to spend watching television?"* and *"During the pandemic, how many hours a day did you watch television?"*. For computer/tablet, participants were asked: *"Usually, before the pandemic, how many hours a day did you use to spend on a computer or tablet?"* and *"During the pandemic, how many hours a day did you use a computer or tablet?"*. We adopted 4 h/day as cut-offs for high TV viewing and computer/tablet use as separate outcomes [15,16]. These cut-off points were adopted based on their association with cardiovascular and all-cause mortality [7].

Correlates

We used sex (male/female), age group (18–29, 30–39, 40–49, 50–59, 60+), highest academic achievement (none or elementary school, high school, and more than high school), skin color (white, black, brown, and other), per capita income (<1, 1–2, and >2 minimum wages [~U$ 195]), and country macro regions (North, Northeast, Midwest, South, and Southeast) as sociodemographic correlates.

For correlates directly associated with the COVID-19 pandemic, we used the working status during the pandemic (normal, home office, no working for any reasons [including vacation]), and adherence to the quarantine. This last was assessed through the question "*During the Coronavirus pandemic, to what extent did you (or do you still) restrict contact with people?*", with possible answers: "*I did nothing, I led a normal life;*" "*I tried to take care, stay away from people, reduce contact a little, not visit older adults, but I kept working and leaving the house;*" "*I stayed at home just going shopping at the supermarket and pharmacy*" or "*I stayed strictly at home, leaving only for health care needs.*" We classified stricter adherence to the quarantine through the answers "*I stayed at home just going shopping at the supermarket and pharmacy*" or "*I stayed strictly at home, leaving only for health care needs.*" Time in quarantine was also collected (< 1 month, 1–2 months, and > 2 months). Those who answered "*I did nothing, I led a normal life;*" "*I tried to take care, stay away from people, reduce contact a little, not visit older adults, but I kept working and leaving the house*" was classified as no adherence to the quarantine (lower impact on daily activities).

Statistical procedures

The incidence was calculated through the proportion of participants without the risky outcome (active and less than 4 h/day of computer/tablet use) before the pandemic who become inactive/sedentary. Percentages and 95% confidence intervals were cal-

Table 1
Characteristics of the general sample and of active and nonexcessive screen time groups before the COVID-19 pandemic

		Before the COVID-19 pandemic		
	Total (n = 39,693)	Active* (n = 14,474)	< 4 h/d TV (n = 36,644)	< 4 h /d of PC (n = 18,636)
Sex				
Female	52.0 (50.5–53.6)	47.9 (45.3–50.6)	52.1 (50.4–53.7)	57.4 (55.2–59.6)
Male	48.0 (46.4–49.5)	52.1 (49.4–54.7)	47.9 (46.3–49.6)	42.6 (40.4–44.8)
Age group				
18–29	25.3 (24.1–26.7)	27.0 (24.7–29.3)	27.1(25.7–28.5)	21.2 (19.6–22.9)
30–39	21.3 (20.0–22.7)	21.8 (19.5–24.2)	22.1 (20.7–23.5)	19.5 (17.8–21.3)
40–49	18.4 (17.2–19.6)	16.9 (15.0–19.0)	18.4 (17.2–19.7)	19.3 (17.6–21.2)
50–59	16.1 (15.1–17.2)	15.9 (14.2–17.7)	15.5 (14.4–16.6)	17.4 (16.0–18.8)
> 60	18.7 (17.5–20.0)	18.5 (16.3–21.0)	16.9 (15.7–18.3)	22.6 (20.9–24.4)
Highest academic achievement				
None or elementary school	9.8 (8.8–10.9)	6.9 (5.4–8.7)	9.2 (8.2–10.4)	13.4 (11.9–15.1)
High school	72.9 (71.7–74.0)	70.6 (68.6–72.6)	72.7 (71.5–73.8)	74.1 (72.4–75.7)
More than high school	17.3 (16.7–17.8)	22.5 (21.2–23.8)	18.1 (17.5–18.7)	12.5 (11.9–13.0)
Skin color				
White	45.6 (44.1–47.0)	48.2 (45.5–50.8)	46.0 (44.4–47.5)	42.9 (41.0–44.9)
Black	8.0 (7.2–8.8)	8.1 (6.8–9.4)	7.7 (7.0–8.6)	8.7 (7.7–9.9)
Brown	45.7 (44.1–47.3)	43.1 (40.2–46.0)	45.5 (43.9–47.2)	47.7 (45.6–49.9)
Other	0.7 (0.6–0.8)	0.7 (0.6–0.9)	0.8 (0.6–0.9)	0.6 (0.5–0.8)
Per capita income				
< 1 MW	48.7 (47.1–50.2)	43.2 (40.4–46.0)	48.6 (46.9–50.2)	53.8 (51.7–55.9)
1–2 MW	24.4 (23.1–25.8)	22.1 (20.0–24.4)	24.2 (22.8–25.6)	22.7 (20.9–24.5)
> 2 MW	26.9 (25.8–28.2)	34.7 (32.4–37.1)	27.2 (26.0–28.5)	23.5 (22.0–25.1)
Macro regions				
North	7.3 (6.3–8.4)	6.9 (5.4–8.7)	7.1 (6.2–8.1)	7.7 (6.4–9.2)
Northeast	24.8 (23.3–26.4)	27.0 (24.1–30.1)	24.8 (23.2–26.5)	25.2 (23.2–27.3)
Southeast	45.8 (44.4–47.3)	46.8 (44.2–49.5)	45.7 (44.1–47.2)	45.9 (43.9–48.0)
South	15.4 (14.4–16.5)	14.4 (9.4–16.3)	15.4 (14.4–16.6)	14.5 (13.2–15.9)
Midwest	6.6 (5.6–7.8)	4.9 (3.9–6.1)	6.9 (5.8–8.3)	6.7 (5.2–8.6)
Working during the pandemic				
No	53.4 (51.9–55.0)	53.4 (50.7–56.1)	52.5 (50.9–54.1)	62.0 (59.9–64.1)
Normal routine	20.6 (19.4–22.0)	20.1 (18.0–22.4)	20.7 (19.4–22.1)	22.1 (20.3–24.0)
Home office	25.9 (24.6–27.2)	26.4 (24.3–28.6)	26.8 (25.4–28.2)	15.9 (14.4–17.6)
Adherence to the quarantine				
No	26.2 (24.8–27.6)	26.3 (23.8–28.9)	26.4 (25.0–27.9)	27.1 (25.2–29.0)
<1 month	20.0 (18.7–21.5)	18.4 (16.2–20.8)	20.1 (18.6–21.6)	21.6 (19.7–23.6)
1–2 months	46.3 (44.8–47.9)	47.6 (44.9–50.3)	46.5 (44.9–48.1)	43.3 (41.3–45.4)
> 2 months	7.4 (6.5–8.2)	7.7 (6.2–9.6)	7.1 (6.3–8.0)	8.0 (6.9–9.2)

CI = confidence interval; MW = minimum wage.
* ≥150 min/week.

culated for the descriptive analysis and comparisons of the incidences between groups [17]. Subsequently, binary logistic models were used to verify the correlates of incidence of physical inactivity, high TV-viewing, and high computer/tablet use. From the crude analysis, correlates with $P < .2$ were tested individually (from the lowest to the highest P value) in the multivariate logistic regression models. However, final models were composed only of correlates that showed $P< .05$. All statistical procedures were conducted using sampling weights (survey command) in Stata 15.1.

Results

Characteristics of the general sample and of active and nonexcessive screen time groups before the COVID-19 pandemic are presented in Table 1. In general, more than half of the participants were not working during the pandemic. Around 20% followed their normal routines and 25% worked in home office. Among those who were in stricter quarantine (73.8%), the majority reported this situation for 1–2 months. Men, higher academic achievement, and higher per capita income were more represented among active individuals, while women, older adults (>60 years), lower academic achievement, and lower per capita income were more represented among <4/d of computer/tablet use before the pandemic.

The incidences of physical inactivity and excessive screen time according to the population subgroups are presented in Table 2. Men and older aged adults presented a lower incidence of physical inactivity. Men (lower), 30–59 years (higher), black skin color (higher), Midwest residents (lower), working during the pandemic (lower), and adherence to the quarantine (higher) were associated with TV-viewing incidence. In addition, older adults (lower), higher academic achievement (higher), white skin color (higher), normal working routine (lower), home office (higher), and adherence to the quarantine (higher) were associated with computer/tablet incidence.

Table 3 shows the crude and adjusted models of the association of correlates with the incidence of physical inactivity, high TV-viewing, and high computer/tablet use. Sex (female) and age groups (younger) were associated with increased inactivity during the pandemic. Age group and the working status during the pandemic were associated with an increase in TV viewing (30–59 years and not working) and increased computer/tablet use (18–29 years; home office). Higher odds for increased TV viewing were also observed in the North compared to the Midwest region. Higher odds for increased computer/tablet use were observed among participants with higher academic achievement, white vs brown skin color, higher income, home office, and who adhered to the quarantine (>2 months compared with no adherence to the quarantine).

Discussion

Our main findings were that the incidence of physical inactivity, ≥4 h/d of TV, and ≥4 h/d of computer/tablet use during the first wave of the COVID-19 pandemic in Brazil were, respectively, 70.4%,

Table 2
Incidence of movement behavior during the COVID-19 pandemic among Brazilian adults

	Physical inactivity*	High TV viewing**	High computer/tablet use**
Total	70.4 (67.8–72.8)	31.4 (29.9–32.9)	37.9 (35.9–39.9)
Sex			
Female	74.6 (71.9–77.2)	33.6 (32.0–35.3)	37.1 (35.0–39.1)
Male	66.5 (62.2–70.5)	29.0 (26.5–31.5)	39.0 (35.2–23.0)
Age group			
18–29	78.2 (74.2–81.8)	27.9 (25.4–30.5)	58.6 (54.4–62.6)
30–39	73.7 (67.8–78.9)	33.6 (30.2–37.2)	37.7 (33.1–42.5)
40–49	66.3 (59.6–72.4)	33.3 (29.9–36.9)	36.6 (31.7–41.7)
50–59	64.0 (58.3–69.2)	33.9 (30.6–37.3)	31.9 (28.3–35.8)
>60	64.3 (56.9–71.1)	29.8 (26.3–33.7)	24.4 (21.1–28.0)
Highest academic achievement			
None or elementary school	62.2 (49.6–73.2)	32.2 (27.1–37.8)	23.6 (18.8–29.2)
High school	70.8 (67.3–74.0)	32.0 (30.1–34.0)	38.5 (36.0–41.0)
More than high school	71.7 (70.7–72.8)	28.4 (27.8–29.1)	49.8 (48.7–50.9)
Skin color			
White	69.8 (67.1–72.3)	29.6 (28.1–31.2)	41.0 (38.8–43.2)
Black	66.9 (58.4–74.5)	35.2 (30.0–40.8)	33.2 (27.9–39.0)
Brown	71.6 (66.6–76.2)	32.5 (29.9–35.3)	35.9 (32.3–39.6)
Other	74.3 (64.0–82.5)	31.3 (23.7–40.2)	45.3 (32.6–58.7)
Per capita income			
<1 MW	69.6 (65.0–73.9)	31.5 (29.3–33.9)	33.8 (31.0–36.8)
1–2 MW	71.1 (65.5–76.2)	32.2 (29.3–35.3)	41.2 (36.8–45.7)
>2 MW	70.8 (67.6–73.8)	30.4 (28.1–32.8)	44.0 (40.5–47.5)
Macro regions			
North	73.5 (60.0–83.7)	33.0 (26.5–40.2)	34.4 (56.6–73.7)
Northeast	71.6 (64.9–77.5)	34.6 (30.8–38.5)	35.9 (31.3–40.7)
Southeast	68.5 (65.7–71.1)	32.3 (30.7–33.9)	39.3 (37.1–41.4)
South	75.6 (66.0–78.4)	27.7 (24.6–31.1)	38.1 (33.8–42.7)
Midwest	71.0 (59.2–80.5)	20.8 (15.8–27.0)	39.5 (26.9–53.8)
Working during the pandemic			
No	71.6 (67.8–75.0)	37.1 (35.0–39.2)	38.1 (35.7–40.6)
Normal routine	67.4 (61.2–73.0)	23.5 (20.2–27.3)	27.0 (22.8–31.7)
Home office	70.3 (66.0–74.3)	26.4 (24.0–28.9)	52.1 (46.7–57.4)
Adherence to the quarantine			
No	66.5 (60.7–71.8)	25.2 (22.4–28.2)	27.3 (23.9–31.1)
<1 month	74.7 (68.8–79.8)	32.5 (28.9–36.6)	38.3 (33.4–43.6)
1–2 months	70.7 (67.3–73.9)	33.8 (31.9–35.8)	45.4 (42.6–48.4)
>2 months	71.4 (60.4–80.4)	35.2 (29.2–41.6)	31.4 (25.5–38.0)

Note: Data are described as% (confidence interval of 95%).
MW = minimum wage.
* <150 min/week. ** ≥4 h/d

31.4%, and 37.9%. Increases in physical inactivity and screen time, even in the short-term, are associated with negative health outcomes [18,19]. Confirming the hypothesis of the effects of the quarantine on movement behaviors, we observed that those who were not working or were working in home office during the quarantine presented higher incidences of high TV-viewing and high computer/tablet use, respectively. The younger age group seemed more affected, with higher incidences of physical inactivity and elevated computer/tablet use, while older groups presented a higher incidence of high TV-viewing. In addition, higher academic achievement, higher per capita income, and white skin color were associated with higher computer/tablet incidence.

With social distancing and quarantine strategies, people spend more time at home, with less opportunity for an active lifestyle. Considering active people and those with no excessive screen time before the pandemic, we observed elevated incidences of unhealthy behaviors, especially physical inactivity. In all population subgroups, most active people became inactive during the first wave of the COVID-19, with incidences varying from 62.2% (lower academic achievement) to 78.2% (18–29 years). This is probably explained by the fact that people usually practice physical activity outside the home (e.g., parks or other places with agglomerations of people), which was restricted during the quarantine. This would also explain why women and the younger age group were more affected, given that they tend to be involved in formal physical activity [20], such as in gyms, which were closed during the pandemic. Strategies should be planned to enable these subgroups to stay active, such as home-based physical activities or outdoor activities organized to avoid agglomerations of people [13,21], as well as to return to their physical activity habits after the pandemic period.

The incidence of ≥4 h/d TV-viewing varied between 23.5% (among people who maintained their normal working routine during the pandemic) and 37% (among those who were not working during the quarantine period). Interestingly, working status during COVID-19 predicted the incidence of high TV viewing even more than adherence and time in quarantine. People who were working in home office, for example, presented 42% fewer odds for higher TV viewing compared to those who were not working during the quarantine. In addition, people from the Midwest macro region presented a lower incidence of high TV viewing compared to the North region. Although this result could be associated with the higher number of cases and deaths in the North compared to the Midwest [22], it may also indicate cultural preferences, since this occurred regardless of the quarantine measures.

Less than a month (55% higher odds) and between 1 and 2 months (98% higher odds) of quarantine were associated with a higher incidence of computer/tablet use. As this study was conducted after less than two months of quarantine in Brazil, the category of >2 months was underrepresented, and future studies should provide evidence on the time trend of these behaviors, with special attention to the variations over the pandemic time and the potential new waves of the COVID-19. Younger age groups, higher

Table 3
Crude and adjusted correlates of incidence of movement behaviors among Brazilian adults during the COVID-19 pandemic (n = 39,693)

	Physical inactivity		TV viewing		Computer/tablet use	
	Crude model	Adjusted model	Crude model	Adjusted model	Crude model	Adjusted model
Sex						
Female	1	1	1	–	1	–
Male	0.68 (0.53–0.85)	0.63 (0.50–0.80)	0.81 (0.70–0.93)	–	1.09 (0.90–1.31)	–
Age group						
18–29	1	1	1	1	1	1
30–39	0.78 (0.54–1.12)	0.78 (0.54–1.12)	1.30 (1.07–1.61)	1.58 (1.28–1.97)	0.43 (0.33–0.56)	0.47 (0.36–0.62)
40–49	0.55 (0.38–0.79)	0.52 (0.36–0.75)	1.29 (1.05–1.58)	1.56 (1.26–1.93)	0.41 (0.31–0.54)	0.43 (0.32–0.58)
50–59	0.49 (0.36–0.69)	0.46 (0.33–0.64)	1.33 (1.09–1.62)	1.49 (1.21–1.83)	0.33 (0.26–0.42)	0.31 (0.24–0.39)
> 60	0.50 (0.34–0.73)	0.48 (0.33–0.72)	1.10 (0.88–1.37)	1.08 (0.86–1.35)	0.23 (0.18–0.29)	0.17 (0.13–0.22)
Highest academic achievement						
None or elementary school	1	–	1	–	1	1
High school	1.47 (0.86–2.51)	–	0.99 (0.76–1.29)	–	2.02 (1.48–2.75)	1.41 (1.02–1.96)
More than high school	1.54 (0.93–2.57)	–	0.84 (0.65–1.07)	–	3.21 (2.39–4.29)	1.72 (1.22–2.44)
Skin color						
White	1	–	1	–	1	1
Black	0.88 (0.60–1.29)	–	1.29 (1.01–1.66)	–	0.72 (0.55–0.93)	0.79 (0.59–1.05)
Brown	1.09 (0.84–1.43)	–	1.15 (0.99–1.32)	–	0.81 (0.67–0.97)	0.82 (0.68–0.98)
Other	1.25 (0.76–2.06)	–	1.08 (0.73–1.61)	–	1.19 (0.69–2.06)	1.16 (0.61–2.20)
Per capita income						
<1 MW	1	–	1	–	1	1
1–2 MW	1.07 (0.77–1.50)	–	1.03 (0.87–1.23)	–	1.37 (1.09–1.71)	1.46 (1.17–1.81)
>2 MW	1.05 (0.82–1.37)	–	0.95 (0.81–1.11)	–	1.54 (1.27–1.86)	1.75 (1.38–2.22)
Macro regions						
North	1	–	1	1	1	–
Northeast	0.91 (0.45–1.81)	–	1.07 (0.75–1.53)	1.06 (0.74–1.53)	1.07 (0.69–1.64)	–
Southeast	0.78 (0.42–1.46)	–	0.97 (0.70–1.33)	0.96 (0.69–1.33)	1.23 (0.83–1.83)	–
South	0.95 (0.48–1.90)	–	0.78 (0.54–1.11)	0.77 (0.54–1.10)	1.18 (0.77–1.80)	–
Midwest	0.88 (0.39–1.97)	–	0.53 (0.34–0.85)	0.54 (0.34–0.85)	1.25 (0.63–2.49)	–
Working during the pandemic						
No	1	–	1	1	1	1
Normal routine	0.82 (0.59–1.13)	–	0.52 (0.42–0.65)	0.46 (0.37–0.58)	0.60 (0.47–0.77)	0.82 (0.56–1.18)
Home office	0.94 (0.72–1.22)	–	0.61 (0.52–0.71)	0.58 (0.49–0.68)	1.76 (1.39–2.24)	1.58 (1.25–2.00)
Adherence to the quarantine						
No	1	–	1	–	1	1
< 1 month	1.48 (1.01–2.18)	–	1.44 (1.14–1.81)	–	1.65 (1.24–2.19)	1.55 (1.06–2.25)
1–2 months	1.22 (0.90–1.64)	–	1.52 (1.27–1.81)	–	2.21 (1.79–2.74)	1.98 (1.42–2.76)
> 2 months	1.26 (0.73–2.19)	–	1.61 (1.18–2.20)	–	1.21 (0.87–1.72)	1.44 (0.94–2.19)

Note: Data are described as OR (confidence interval of 95%).
MW = minimum wage.
Values are presented only for variables remaining in the adjusted models.

academic achievement, higher per capita income, and white people were more prone to present increased computer/tablet use. These increases may be explained by the new online social and occupational activities (study/work). Those who reported home office were 58% more likely to present increased computer/tablet use. Although increases in computer/tablet use and other communication technologies seems natural in social distancing periods, surveillance of how this affects family relationships and mental health are needed [21,23]. In other countries, such as the United States, Italy, and Spain, an increase in the use of television, and greater use of applications via the internet and smartphones and computers during the pandemic were also identified [24,25].

The limitations of this study should be mentioned. People with low income/academic achievement may have had difficulty accessing and completing the online questionnaire, which provided less representativeness of this group. We highlight that the period of data collection (April 24th and May 24th, 2020) was not at the peak of the COVID-19 cases in Brazil, which should be considered for data interpretation. In addition, self-reported behaviors are subject to reporting bias and categorical responses to frequency and duration of physical activity can potentially incur misclassification. However, we used questionnaires based on the "Brazilian Telephone-based Risk Factor Surveillance System for Chronic Diseases," which presented good reliability for leisure physical activity (K = 0.70), moderate reliability for TV viewing (K = 0.56), and good comparability with the Global Physical Activity Questionnaire [26]. We highlight that this is the first nationally representative study to quantify incidences of inadequate movement behaviors and to identify more affected population groups during the COVID-19 pandemic quarantine, which could help healthy lifestyle promotion for this and possible future periods with pandemics.

In conclusion, high incidences of physical inactivity and excessive screen time were observed among the Brazilian population during the first wave of the COVID-19 pandemic quarantine. We identified population groups more affected by the pandemic, which should be the target of interventions in this first phase of the pandemic in Brazil. Further studies on the surveillance of movement behaviors as well as their effects in different phases of the pandemic period are warranted.

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Authors' contributions

All authors contributed to the study's conception and design. Material preparation and data analysis were performed by Danilo R. Silva, André O. Werneck, and Célia L. Szwarcwald. The first draft of the manuscript was written by Danilo R. Silva and all authors

commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Ethics approval

All procedures performed in studies involving human participants were under the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Comissão Nacional de Ética em Pesquisa (No. 3.980.277).

Consent to participate

Informed consent was obtained from all individual participants included in the study.

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